REMARKS

Claims 1-14 and 35-54 are pending in this application. Of these claims, claims 1, 2, 6-9, 12, 13, 35, 37, 40, 43, 46, 50-52 and 54 stand rejected under 35 USC §102(b) as being anticipated by Shepard et al.; Claims 3-5, 38, 39, 14, 41, 42, 44, 45 and 47-49 and 53 stand rejected under 35 USC §103(a) as being unpatentable over Shepard in view of Thomas et al.; and Claims 10, 11 and 36 stand rejected under 35 USC §103(a) as being unpatentable over Shepard in view of Toomey et al.

In view of the following remarks, these rejections are traversed, and reconsideration of this application is respectfully requested.

Applicant's invention is a system and related method for inducing acoustic chaos in a structure. The system includes a sound source for applying a sound signal to the structure that induces the acoustic chaos in the structure and causes the structure to vibrate in a chaotic manner. A thermal imaging camera generates thermal images of the structure to possibly identify heated defect in the structure.

U.S. Patent Publication 2002/0172410 by Shepard discloses a vibrothermography system in paragraph 119 with reference to figure 19. The Shepard system includes an ultrasonic transducer 910 that applies acoustic energy to a sample 902. The acoustic energy is absorbed by the sample 902, which causes internal frictional heating between the faces of a disbond 904. This internal heating is detected by an infrared camera 906 to identify the disbond 904.

Applicant submits that systems that use ultrasonic sound energy to vibrate the edges of cracks in a structure to heat the cracks so that they are detectable by a thermal imaging camera are known in the art. Applicant has previous patents on this

technology, including U.S. Patent No. 6,236,049. What Applicant is claiming as new is a system that causes the sound signal applied to the sample to induce acoustic chaos in the sample to significantly increase the vibration of the edges of cracks against each other so that tighter and smaller cracks, or other imperfections, are more readily visible in the thermal images. Shepard, or any other reference of record, does not teach or suggest inducing acoustic chaos in a structure.

Applicant submits that acoustic chaos is a term of art, and is well defined in Applicant's specification, for example, at paragraph 48 citing Rasband, S. Neil et al. Paragraphs 49-56 of the specification describe how various parameters of the system can be selected or used to induce the acoustic chaos in the structure, and specific examples of what acoustic chaos signals look like. The various system parameters that allow the sound signal to induce acoustic chaos in the structure may include one or more of the force applied to the sound source against the structure, the material of a coupler between the sound source and the structure, the thickness of the coupler, the frequency of the acoustic signal, the duration of the acoustic signal, etc.

The independent claims identify one or more of these parameters. For example, independent claim 1 states that the sound source is coupled to the structure in a manner so that the sound signal induces acoustic chaos in the structure. Independent claim 13 states that the amount of force, the duration of the pulse sound signal and the frequency of the sound signal are selected to induce acoustic chaos in the structure. Independent claim 14 includes an electronic chaos signal generator that generates a chaos signal, a broadband transducer receiving the chaos signal, and a coupler coupling the transducer of the structure so that the transducer converts the chaos signal to a sound signal that induces acoustic chaos

of the structure. Independent claim 43 states that the sound signal is an ultrasonic pulse signal coupled to the structure where the pulse signal has a pulse width and frequency, and where the force of the transducer against the structure, the frequency of the signal and the pulse width of the signal are selected so that the signal induces acoustic chaos in the structure. Independent method claim 50 includes coupling a sound source to the structure in a manner so that the sound signal induces acoustic chaos in the structure.

It may be that a sound signal in the frequency range of 10kHz to 30kHz as identified in paragraph 119 of Shepard, that is either continuous or time varying, could induce acoustic chaos in the sample. However, the vibrothermography system disclosed by Shepard has to include or do certain things to cause the signal to generate the acoustic chaos in the sample. Shepard does not do any of these things, and nowhere discusses generating acoustic chaos. Shepard does not appreciate the benefits of inducing acoustic chaos in the sample so that the various defects therein can be better imaged. The acoustic signal in Shepard is merely sent into the sample, and does not induce acoustic chaos therein. Therefore, Applicant submits that Shepard cannot anticipate any of independent claims 1, 13, 43 and 50.

U.S. Patent No. 6,399,948 to Thomas et al. discloses a system of the type being discussed herein that uses a coupler to couple sound energy from a sound source to a structure. This patent includes previous work by the inventors relating to the subject matter of the present invention. However, Thomas et al. does not teach or suggest that the coupler, or any other parameter of the system, is purposely selected or used so that the sound signal induces acoustic chaos in the structure. Contrary, this previous work by Applicant maintained the integrity of the sound signal in the structure, and did not induce acoustic chaos in the structure. The coupler is

used to allow the sound signal to enter the structure with less attenuation. Therefore, Thomas et al. does not provide the teaching missing from Shepard to make Applicant's claimed invention obvious.

U.S. Patent Publication 2003/0014199 to Toomey et al. discloses a system to detect the existence and location of a fault in a structure, such as a building. It is believed that the Examiner is relying on Toomey et al. to teach using an optical vibration sensor to sense vibrations in a structure. However, what Toomey et al. fails to teach or suggest is inducing acoustic chaos in a structure, as discussed above. Therefore, Toomey et al. does not provide the teaching missing from Shepard to make Applicant's claimed invention obvious.

In view of the preceding discussion, it is respectfully request that the §102 and §103 rejections be withdrawn.

It is now believed that this application is in condition for allowance. If the Examiner believes that personal contact with Applicant's representative would expedite prosecution of this application, the Examiner is invited to call the undersigned at her convenience.

Respectfully submitted,

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